IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES
(Attorney Docket No. 500402.00273)

In re U.S. Patent Application of Swales	)	
	)	
Application No. 10/003,123	)	Art Unit: 2143
	)	
Filed: November 26, 2001	)	Examiner: Lezak
	)	
For: Messaging Application Layer Over Ethernet to Transport Layer (TCP) Communications Method and Apparatus for a Modular Terminal Input/Output System	)	Confirmation No. 6275

BRIEF ON APPEAL

Mail Stop: Appeal Brief-Patents
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This is an appeal brief in accordance with 37 CFR §1.192 filed in support of Applicant's August 20, 2007 Notice of Appeal. Appeal is taken from the Final Office Action dated April 19, 2007. Accordingly, Applicant requests a five-month extension of time and the Commissioner is hereby authorized to charge any necessary fees to Deposit Account 19-0733. Should any additional fees be due, the Commissioner is authorized to charge such fee to Deposit Account No. 19-0733.

I. REAL PARTY IN INTEREST

The owner of this application, and the real party in interest, is Schneider Automation, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-10, and 31 were previously cancelled. Claims 11-30 remain in the application. All pending claims (11-30) stand rejected. Applicant is appealing all pending claims (11-30). All claims are shown in the attached appendix.

IV. STATUS OF AMENDMENTS

There are no amendments subsequent to the Final Office Action dated April 19, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

In making reference herein to various portions of the specification and drawings in order to explain the claimed invention (as required by 37 CFR §41.37(c)(1)(v)), Applicant does not intend to limit the claims. All references to the specification and drawings are illustrative unless otherwise explicitly stated.

Aspects of the claimed subject matter are directed to improved network communication system and Ethernet modules that may be used in network communication systems. Specifically, "the invention allows inexpensive standard network components to be used in place of specialized real time field bus components in communicating with industrial sensor and actuator devices. This enables major savings in cost and complexity when connecting simple devices to a network solution involving programmable controllers or other industrial computer systems, since the same networking infrastructure components can be shared." (Specification Page 4, lines 2-25).

There are two (2) independent claims (claims 11 and 24) pending in the application, both of which are rejected. Independent claim 11 is directed towards a network communication system. The first element of claim 11 recites "a master device for initiating a request message." Figure 3 shows exemplary Master Device 12. As provided in the Specification, "[F]or one embodiment of the invention...all requests will be initiated at the 'master'. This means the slave has no need to initiate connections or resolve symbolic Domain Name Service (DNS) names." (Specification, Page 8, lines 6-9, emphasis added).

The second element of the network communication system of claim 11 recites "an input/output slave device being exclusively responsive to the request message of the master device." As provided in the Specification, "[t]he present invention also includes a method for providing a connection between a master device 12 and an I/O device 14 [of Figure 3] having an output and/or an input...[t]he method also includes receiving the output from the I/O device 14. The method further includes transmitting a response message over the transmission path in response to the request message, the response message correlating to the output of the I/O device 14."

The next element of claim 11 recites "an adapter device directly attached to a body of the slave device, the adapter device comprising an interface circuit for transmitting a response

message to the master device in response to the request message received on a preregistered TCP port selected from a plurality of TCP ports, the response message correlating to an output received from the slave device, the adapter device configured to directly attach to an in-data port and an out-data port of the body of the slave device." (emphasis added). First, regarding the "direct attachment" language, Figure 1 illustrates COM-adapter 10 directly attached to the body of the I/O device body 2.

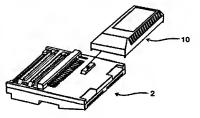
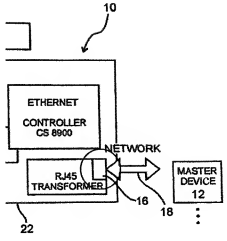


Fig. 1

Applicants' Specification further states that "the communication adapter is configured to directly attach to and communicate through at least an in-data port, the out-data port, and the identification port of the input/output body. (Specification Page 4, lines 1-3). As explained above, this allows for quickly and easily connecting the input/output device. (see, e.g., Specification Page 4, lines 2-25).

Figure 3 (partially reproduced below), illustrates the use of a "preregistered TCP port" as recited in the element. Specifically, in one disclosed "method for providing a connection between a master device and an I/O device 14 having an output, the method includes receiving over a transmission path 18 a request message on a preregistered TCP port 16 selected from a plurality of TCP ports." (Specification, Page 3, lines 19-22, emphasis added).



The last element of independent claim 11 recites "an optimal protocol utilized to communicate the request message and the response message between the master device and the adapter device, the optimal protocol comprising: an IP protocol; a TCP protocol; and, an application layer protocol wherein building and parsing of the response message is responsive to a first part of the request message." The application indicates:

> Modbus: the COM-adapter will accept MODBUS messages over TCP/IP using the MBAP protocol to communicate with certain boards. Modbus function codes 9 (read registers), 16 (write multiple registers) and 23 (read/write) will be processed by the software (See Appendix A), which is attached hereto, and which is incorporated by reference herein, and passed to the ATI interface. Message 8, sub-function 21 (get/clear statistics), will return Ethernet statistics similar to the NOE2.times.1. Modbus 125 commands will be processed by the kernel for executive download. The COM-adapter will respond to all other Modbus messages with exception code 01 (illegal function). TCP/IP: the COM-adapter will run an optimized communication stack. This stack will enable the COM-adapter to respond to Modbus messages with minimum turn around time. It must also handle other network traffic, such as ARP requests and ICMP echo requests, in a manner consistent with the associated protocols. The COM-adapter will receive its network parameters from a BOOTP type server or use those retained in nonvolatile storage, if available. The Modbus handler will field requests from the network and either respond directly or pass the request to the ATI interface. The handler will maintain the internal configuration s and status registers, and arbitrate write access to the COM-adapter.

(Specification, Page 17, line 19 – Page 18, lines 8; see also Page 8, lines 20-21, which relates to the "MODBUS/TCP/Ethernet implementation").

Independent claim 24 is directed towards a high performance Ethernet module. The module comprises "an Ethernet controller operably coupled to a network connection." An exemplary Ethernet controller (CS8900) is provided on Page 15, lines 15-25. As seen in Figure 3, Ethernet Controller CS8900 (within element 10) is operatively coupled to network connection 18.

The module of claim 24 further comprises "a control processing unit operably coupled to the Ethernet controller and directly attached to a factory automation device." Figure 1 illustrates COM-adapter 10 directly attached to the body of the I/O device body 2.

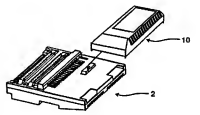


Fig. 1

The Specification further states that "the communication adapter is configured to directly attach to and communicate through at least an in-data port, the out-data port, and the identification port of the input/output body. (Specification Page 4, lines 1-3).

The module further comprises "a preregistered TCP port selected from a plurality of TCP ports for receiving messages over the network connection." Figure 3 (partially reproduced above in relation to independent claim 11), illustrates the use of a "preregistered TCP port" as claimed. Specifically, in a "method for providing a connection between a master device and an I/O device 14 having an output, the method includes receiving over a transmission path 18 a request message on a preregistered TCP port 16 selected from a plurality of TCP ports." (Specification, Page 3, lines 19-22, emphasis added).

Lastly, the module further comprises "an optimal communication stack that executes on the control processing unit, the optimal communication stack being capable of processing a TCP protocol, an IP protocol and an application layer protocol using a state machine, the processing further including building and parsing a communication message dependent upon a

predetermined index of the message and creating a pre-calculated response message." As provided in the Specification:

> By making a number of simplifying assumptions about the relationship between the target `slave` device and its interrogating >master= device, the obligations of the receiving software (See Appendix A) can be reduced from the traditional `network protocol stack` consisting of a number of interacting software (See Appendix A) components to simpler `state machine` where the correct response to an incoming request can be rapidly determined from the content of the start of the request message…As a result, the MODBUS/TCP/Ethernet implementation, as an example, can implement largely pre-calculated responses to the following messages…"

(Specification, Page 8, lines 1-6 and lines 20 -21, emphasis added).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- Claims 11-30 are rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Salas (US Patent 5,862,391) in view of Hershey (US Patent 5,375,070) and further in view of Friedman (US Patent 5,757,924).

VII. ARGUMENT

Introduction

Independent claim 11 includes the claimed feature of "the adapter device comprising an interface circuit for transmitting a response message to the master device in response to the request message received on a preregistered TCP port selected from a plurality of TCP ports, the response message correlating to an output received from the slave device." The Office Action attempts to equate the claimed adapter device of independent claim 11 to the Modbus concentrator of Salas. Applicants respectfully disagree as the Modus concentrator described in Salas:

> is generally a multiple channel data converter/multiplexer which translates data between two protocols for multiple metering and protective devices (i.e., between General Electric Co.s' Commnet peer to peer network protocol and the industry standard Modbus RTU protocol.) The concentrator acts as a pseudo host for Commnet devices and as a pseudo slave for each device in the Modbus RTU network.
>
> Column 5, lines 42-49.

The Modus concentrator of Salas does not transmit a response message to the master device . . . on a preregistered TCP port selected from a plurality of TCP ports." In fact, the Modbus concentrator provides an interface between Modbus RTU protocol and Commnet protocol (of General Electric Co.) and does not provide for communications using TCP/IP through a TCP port.

Moreover, the Modbus concentrator of Salas does not utilize Applicants' optimal protocol. Independent claim 11 includes the feature of "an optimal protocol utilized to communicate the request message and response message between the master device and the adapter device." The optimal protocol comprises an IP protocol, a TCP protocol, and an application layer protocol. Cleary, the Modbus concentrator of Salas does not utilize the claimed optimal protocol.

Furthermore, the Modus concentrator of Salas does not disclose the claimed feature of "an adapter device directly attached to a body of the slave device . . . the adapter device

configured to directly attach to an in-data port and an out-data port of the body of the slave device." (Emphasis Added). Support for Applicants' claimed feature may be found in at least Figure 1 which illustrates the COM-adapter 10 directly attached to the body of the I/O device body 2.

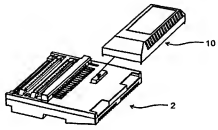


Fig. 1

In addition, Applicants' specification states:

> Specifically, the communication adapter is configured to directly attach to and communicate through at least an in-data port, the out-data port, and the identification port of the input/output body.
>
> (Specification Page 4, lines 1-3)

As explained in Applicants' specification, this allows for quickly and easily connecting the input/output device to the network without-requiring special couplers or other devices to be implemented in the network. As explained in the application,

> the invention allows inexpensive standard network components to be used in place of specialized real time field bus components in communicating with industrial sensor and actuator devices. This enables major savings in cost and complexity when connecting simple devices to a network solution involving programmable controllers or other industrial computer systems, since the same networking infrastructure components can be shared.
>
> (Specification Page 4, lines 2-25).

The Office Action is equating the claimed "master device" with the computer (122, 142) of Salas, the claimed "slave device" with the power monitoring devices of Salas, and the claimed "adapter device" with the Modbus concentrator. However, the Modbus concentrator of Salas is not directly attached to a body of a power monitoring device.

Moreover, the Office Action states that Salas discloses "an Ethernet module wherein the control processing unit is directly attached to a factory automation unit (Fig. 2; Fig. 3; Col. 10, lines 15-67; and Col. 11, lines 1-18)." Applicants have reviewed the cited section and respectfully summit that the cited sections do not disclose an Ethernet module directly attached to a factory automation unit. Applicants respectfully submit that Salas does not disclose the claimed feature of an adapter device directly attached to a body of the slave device.

Applicants respectfully submit that the Modbus concentrator and Ethernet gateway illustrated in Salas is not directly attached to the body of a slave device. In addition, Friedman does not make up for the deficiencies in Salas and Hershey. Therefore, Applicants respectfully submit that independent claim 11 is allowable for at least the above stated reason. Dependent claims 12-23 which ultimately depend from independent claim 11 are allowable for at least the same reason as independent claim 11.

Independent claim 24 includes the claimed feature of "a control processing unit operably coupled to the Ethernet controller and directly attached to a factory automation device." (Emphasis added). Applicants respectfully submit that for the same reasons as discussed above with respect to independent claim 11, independent claim 24 is allowable over the Salas and Hershey.

In addition, the Office Action has failed to show an incentive or motivation in the prior art to make the combination of Salas with Hershey. The Office Action maintains:

> The motivation to substitute the optimized MODBUS/TCP/IP stack of Salas with the finite state machine of Hershey is to provide an architecture and method for applying a real time feedback control to the logical or physical network behavior of a complex data communication network, (Hershey, Col. 3, lines 48-51).
>
> (Final Office Action dated April 19, 2007, p. 4-5)

However, this object of Hershey fails to provide the required incentive to modify the system of Salas with features of Hershey. There is nothing in Salas, Hershey, or anywhere else in the prior art that suggests that a system such as the one disclosed in Salas is or would be concerned with "real time feedback control." Moreover, there is no evidence that the system of Salas, if modified as proposed by the Examiner, would continue to function for its intended purpose (i.e., to control and monitor power usage or consumption between multiple networks). In this regard, there is no evidence in the prior art that the state machine of Hershey would work or is easily adaptable to the multiple network environment of Salas. Accordingly, Applicants respectfully submit claim 24 is patentable over Salas in view of Hershey.

Dependent claims 25-30 which ultimately depend from independent claim 24 are allowable for at least the same reason as independent claim 24.

Applicants respectfully submit that all remaining pending claims are in condition for allowance. Should the Examiner believe that a conversation with Applicants' representative would be useful in the prosecution of this case, the Examiner is invited and encouraged to call Applicants' representative.

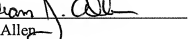
For at least the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection.

CONCLUSION

The rejections contained in the Action of April 19, 2007 should be reversed for at least the reasons recited above. Reversal of the rejections is respectfully requested.

Respectfully submitted,

Dated: March 20, 2008

By: 

William J. Allen
Reg. No. 51,393
BANNER & WITCOFF, LTD.
10 South Wacker Drive
Suite 3000
Chicago, IL 60606
Telephone: 312-463-5000
Facsimile: 312-463-5001

CLAIMS APPENDIX

1-10. (Canceled)

11. A network communication system comprising:

a master device for initiating a request message;

an input/output slave device being exclusively responsive to the request message of the master device;

an adapter device directly attached to a body of the slave device, the adapter device comprising an interface circuit for transmitting a response message to the master device in response to the request message received on a preregistered TCP port selected from a plurality of TCP ports, the response message correlating to an output received from the slave device, the adapter device configured to directly attach to an in-data port and an out-data port of the body of the slave device; and

an optimal protocol utilized to communicate the request message and the response message between the master device and the adapter device, the optimal protocol comprising:

an IP protocol;

a TCP protocol; and,

an application layer protocol wherein building and parsing of the response message is responsive to a first part of the request message.

12. The network communication system of claim 11 wherein the application layer protocol is MODBUS.

13. The network communication system of claim 11 wherein the response message is responsive to the content of the first part of the request message.

14. The network communication system of claim 11 wherein the master device exclusively initiates the request message.

15. The network communication system of claim 11 further comprising a set of predetermined response messages including at least one predetermined response message, each

predetermined response message being distinguishable by the first part of the request message wherein the predetermined response message is determined from the content of the first part of the request message and rapidly selected for quickly responding to the request message.

16. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to an address resolution protocol request message.

17. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to an Internet control management protocol request message.

18. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to a TCP connection request message.

19. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to a TCP disconnect request message.

20. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to a MODBUS request message as a TCP data frame.

21. The network communication system of claim 11 wherein each device limits its message to a length that is less than both a TCP transaction length and a maximum transmission unit.

22. The network communication system of claim 11 wherein the optimal protocol exclusively utilizes a TCP port number 502.

23. The network communication system of claim 22 wherein any message not transmitted via the TCP port number 502 is ignored.

24. A high performance Ethernet module comprising:

an Ethernet controller operably coupled to a network connection;

a control processing unit operably coupled to the Ethernet controller and directly attached to a factory automation device;

a preregistered TCP port selected from a plurality of TCP ports for receiving messages over the network connection; and,

an optimal communication stack that executes on the control processing unit, the optimal communication stack being capable of processing a TCP protocol, an IP protocol and an application layer protocol using a state machine, the processing further including building and parsing a communication message dependent upon a predetermined index of the message and creating a pre-calculated response message.

25. The Ethernet module of claim 24 wherein the application layer protocol is MODBUS.

26. The Ethernet module of claim 25 wherein the communication message is limited to a length that is less than both a TCP transaction length and a maximum transmission unit.

27. The Ethernet module of claim 24 wherein the optimal communication stack is configured to quickly provide the response message responsive to a request message.

28. The Ethernet module of claim 27 wherein the communication message further comprises the request message having a first portion and the response message being responsive to the first portion of the request message wherein the response message is determined from the content of the first portion of the request message and rapidly selected for responding to the request message.

29. The Ethernet module of claim 27 wherein the communication message is limited to a length that is less than both a TCP transaction length and a maximum transmission unit.

30. The Ethernet module of claim 24 wherein the communication protocol exclusively utilizes TCP port number 502 as the preregistered TCP port.

31. (Canceled).

VII. EVIDENCE APPENDIX

None.

VIII. RELATED PROCEEDINGS APPENDIX

None.